

## POSTERIOR COLPORRHAPHY HAS NO IMPACT ON THE URETHRAL CLOSURE MECHANISM.

### Hypothesis / aims of study

The prediction of de novo stress urinary incontinence (SUI) after pelvic organ prolapse (POP) surgery is an unsolved enigma. Urethral pressure reflectometry (UPR) has shown that the urethral closure mechanism is deteriorated after anterior colporrhaphy; this is most likely the cause of postoperative SUI. The preoperative value of urethral pressure during straining is a predictor of the risk of postoperative SUI (1). Studies have shown similar prevalence of SUI in women with posterior POP, which is thought to compress the urethra (2). It is however unclear whether postoperative de novo SUI is as frequent in these women, as it is in women with anterior POP. As far as we know, there are no studies on how the urethral closure mechanism is affected by surgery for posterior POP.

We sought to investigate the mechanism of continence in women with posterior POP before and after posterior colporrhaphy, by means of urethral pressure reflectometry.

### Study design, materials and methods

This was a prospective, observational study where women with posterior POP  $\geq$  grade two, scheduled for posterior colporrhaphy, were recruited from our outpatient clinic. The women were excluded if they: had concomitant vaginal wall prolapse  $\geq$  grade two in the anterior compartment; had a history of previous POP- or SUI surgery or hysterectomy; used any medicine for urinary incontinence. All study participants gave their written consent.

The women were examined twice; before and after posterior colporrhaphy. Visits included POP staging according to the Pelvic Organ Prolapse Quantification (POP-Q) system and UPR measurements, in a supine position.

Principles of UPR (3): UPR allows for simultaneous measurements of pressure and cross-sectional area along the entire length of the urethra, using a polyurethane bag, connected to a 45 cm long tube, inserted into the urethra. Thus, the opening pressure, which is the pressure needed to open the collapsed urethra, is measured. Measurements are done at rest, during squeezing and straining with simultaneous recordings of abdominal pressure. Measurements during straining are evaluated by plotting related values of urethral and abdominal pressures, creating a linear graph, a pressuregram. The slope of the line is called APIR (abdominal to urethral pressure impact ratio) and expresses how abdominal pressure affects urethral pressure. Using APIR, the opening pressure at a standardized abdominal pressure of 50 cmH<sub>2</sub>O, P<sub>O-Abd 50</sub> is calculated.

We expected a 10 cmH<sub>2</sub>O decrease in P<sub>O-Abd 50</sub> to be clinically relevant. With no information regarding the standard deviation (SD) of P<sub>O-Abd 50</sub>, SD was set to 18. With a power of 80% and  $\alpha$  of 5%, a sample size of 26 was required. Alongside this study, a study on the reproducibility of UPR in women with POP was done; in this study the SD was 7.9. Since updated calculation with the new SD revealed a power of 99.9% with the 17 included patients, inclusion was stopped.

Pre- and postoperative parameters were compared with paired t-tests and p-values <0.05 were considered statistically significant.

### Results

Our study group consisted of 17 women with posterior POP  $\geq$  grade 2 with a mean age of 58 (34-77) years. Twelve were postmenopausal, and nine of them used local estrogen therapy. Median parity was two (1-4). The women were examined at a median of 17 (7-83) days before surgery and 53 (42-172) days after surgery. All women underwent posterior colporrhaphy: seven had concomitant perineorrhaphy. There were no other concomitant procedures.

The table shows the changes in parameters before and after posterior colporrhaphy.

Parameter	Preoperative	Postoperative	Difference (p-value)
P <sub>O-rest</sub> , cmH <sub>2</sub> O	54.5	53.4	-1.1 (0.4)
P <sub>O-squeeze</sub> , cmH <sub>2</sub> O	71.8	68.9	-2.9 (0.2)
P <sub>O-Abd 50</sub> , cmH <sub>2</sub> O	78.2	76.0	-2.3 (0.2)
APIR	0.75	0.69	-0.07 (0.3)

The numbers are reported as means. P<sub>O-rest</sub>: opening pressure at rest, P<sub>O-squeeze</sub>: opening pressure during squeezing, P<sub>O-Abd 50</sub>: opening pressure at an abdominal pressure of 50 cmH<sub>2</sub>O, APIR: abdominal to urethral pressure impact ratio.

### Interpretation of results

We found that urethral pressure at rest, during squeezing and straining remains unaffected after posterior colporrhaphy. Our study has shown that posterior colporrhaphy has insignificant impact on the urethra; neither the sphincter nor the supporting closure forces are affected by surgery. In contrast, we have previously found that urethral pressure is decreased after anterior colporrhaphy; the most significant decreases were seen in P<sub>O-Abd 50</sub>, which dropped 12 cmH<sub>2</sub>O (p<0.0001) after surgery, and APIR, which dropped 0.3 (p<0.01). Thus, the mechanism of continence is not affected in the same way after a posterior colporrhaphy as it is after an anterior colporrhaphy. Our results do not support the theory of the posterior POP masking SUI. SUI and posterior POP are probably not associated, other than both being the results of pregnancy and birth. Therefore, SUI with concomitant posterior POP should be evaluated and treated as independent conditions.

### Concluding message

To the best of our knowledge, this is the first study to investigate the urethral closure mechanism after surgery for posterior POP. We have found that the urethral closure mechanism is unaffected by posterior colporrhaphy.

### References

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### Disclosures

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